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10/674,703	09/30/2003	David L. O'Meara	FKL-002	4557

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EXAMINER

GEORGE, PATRICIA ANN

ART UNIT	PAPER NUMBER
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1765

NOTIFICATION DATE	DELIVERY MODE
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06/12/2007

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/674,703

Applicant(s)

O'MEARA ET AL.

Examiner

Patricia A. George

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,5-8,20,21,23,24 and 30-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-2, 5-8, 20-21, 23-24, and 30-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement filed 5/9/07 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because each page of the list must include: the application number of the application in which the IDS is being submitted, and a heading that clearly indicates that the list is an information disclosure statement. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e) and 1.98. See MPEP § 609.05(a).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 2 rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention. Evidence that claim 2 fail(s) to correspond in scope with that which applicant(s) regard as the invention can be found in applicants' specification which repeatedly state "(or a protective coating on a

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system component)", and this statement indicates that the invention is different from what is defined in the claim(s) because the claim language clearly indicates a "protective coating" is one selected from the group comprising system components. Applicant fail to claim the protective coating is on a system component and repeatedly argue a protective coating not on another system component is invalid.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 5, 6, 7, 20, 21, 31, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Ludvikson et al. (2004/0125360).

Ludvikson et al. teaches the status of a system component can be determined during plasma processing, by monitoring the characteristic fluorescent emission from an emitter integrated into the system component; a method for determining the status of a system component is to use optical emission spectroscopy (OES) to monitor a wavelength range where the characteristic fluorescent emission occurs; a system component can contain at least one emitter, that is capable of fluorescent emission at characteristic wavelength(s), that allows for identification of the system component; when an intensity level of an emission with a characteristic wavelength crosses a

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specified threshold value (e.g., increase above a particular value or drop to substantially zero), a determination can be made whether the system component needs to be replaced, and based on the determination, the process can be continued or stopped (see para. 77).

Ludvikson et al. teaches consumable system components can be monitored (i.e. a method of monitoring status of a system component) in a plasma processing system (see ab.) for processing semiconductor substrates (see Background), the system component being different than the semiconductor substrates processed in the processing system (see ab), the method comprising: exposing a the system component to a plasma (para. 007) (i.e. reactant gas) during a process (see summary), wherein the system component consists of a material selected from quartz, Al₂O₃, and SiC (page 7, col. 1, line starting 15.), and wherein the reactant gas is capable of etching (para. 0003) the system component material (para. 0014) to form an erosion product thereof (para 0009); monitoring the processing system for release of the erosion product during the process (para. 009); and stopping the process when the monitoring indicates release of the erosion product at a threshold value (page 7, col. 2, line starting 28).

As for claim 2, Ludvikson et al. teaches exposing includes that the system component is a liner, shield, a ring, a baffle, an electrode (para. 5), a wall (para. 0070), a substrate holder (para. 47), and a heater (para. 46).

As to claim 5, Ludvikson et al. teaches the exposing includes the system component having a material deposit thereon (para. 0074), and wherein the process is

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a cleaning process (para. 47-50) for removing the material deposit from the system component (para. 0074).

As to claim 6, Ludvikson et al. teaches wherein the exposing comprises the system component having a material deposit thereon containing at least SiO₂ (see para. 74), and wherein the process is a cleaning (i.e. etching) process for removing the material deposit from the system component (para. 0003).

As to claim 7, Ludvikson et al. teaches the process comprises at least one of a chamber cleaning process (para. 003 - i.e. etching), a substrate etching process (see para. 0003), and a substrate film formation process (para. 003).

As to claim 20, Ludvikson et al. teaches the monitoring comprises using an optical monitoring system to detect light absorption of the erosion product (para 0056).

As to claim 21, Ludvikson et al. teaches the monitoring further comprises determining if the intensity level of the light absorption has reached the threshold value. (para. 0056).

As to claim 31, Ludvikson et al. teaches forming a protective coating on a the system component (para.74); exposing the protective coating to a reactant gas during a process (see summary), wherein the reactant gas is capable of etching the protective coating to form an erosion product (para. 76-77); monitoring the processing system for release of the erosion product during the process to determine status of the system component (para. 77); and based upon the status from the monitoring, performing one of the following: (a) continuing the exposing and monitoring; and (b) stopping the process (para. 77).

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As to claim 32, Ludvikson et al. teaches the forming of a protective coating comprises forming at least one of SiO₂, Y₂O₃, Sc₂O₃, Sc₂F₃, YF₃, La₂O₃, CeO₂, Eu₂O₃, Dy₂O₃, SiO₂, MgO, Al₂O₃, ZnO, SnO₂, and In₂O₃ (see para. 0074).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 8, 9, 12, 13, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ludvikson et al. (2004/0125360), as applied to claims 1, 2, 5, 6, 7, 20, 21, 31, and 32 above, in view of Yin et al. (6379575).

Ludvikson et al. teaches a specific set of supplied process gases, under vacuum conditions, under predetermined conditions (e.g., chamber pressure, temperature, gas flow rate, etc.) are chosen to produce a population of charged species and chemically reactive species suitable to the particular process being performed within the chamber for etching processes where materials are removed from the substrate or deposition processes where materials are added to the substrate (see Background).

Ludvikson et al. is silent as to the specific parameters of the process controls, as in claims 8-18.

Yin et al. teaches a reactant gas containing a halogen-containing gas for cleaning the system components during a chamber cleaning process (starting col. 8, line 39), as in claim 8; use NF.sub.3, CF.sub.4, SF.sub.6, C.sub.2 F.sub.6, CCl.sub.4, C.sub.2 Cl.sub.6 or mixtures thereof, and halogen containing HF for cleaning the system component during a chamber cleaning process, as in claim 9; use of halogen-containing (col.11, l.16-18 and col.13, l.13-14) and Hf-containing (col.11, l.15) gases for etching, as in claims 12 and 13; Yin teaches operating the processing system at a chamber pressure of 0.1 to 400mTorr, which is overlapping and encompassed by the claimed range of between 10 mTorr and about 760 Torr during the exposing (col. 7, l. 33).

Claim Rejections - 35 USC § 103

Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ludvikson et al., as applied to claims 1, 2, 5, 6, 7, 20, 21, 31, and 32 above, in view of Chow et al. of USPN 6,872,322.

The teachings of Ludvikson et al. are silent as to the types of reactant gas used for chamber conditioning, as in claims 10 and 11.

Chow teaches it is conventional to use a reactant gas containing silicon (col. 13, l. 55-60), or NH.sub.3 (col. 9, l. 11, and 26-30) when conditioning a chamber (col. 12., l. 13-17) as in claims 10 and 11.

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As for claim 10, Chow teaches the exposing comprises the reactant gas containing at least one of a silicon-containing gas (col. 13, l. 55-60) for conditioning the system component during a chamber conditioning process (col. 12, l. 13-17).

As for claim 11, Chow teaches the exposing comprises the reactant gas containing at least one of dichlorosilane and NH_3 (col. 9, l. 11, and 26-30) for conditioning the system component during a chamber conditioning process.

It would have been obvious to one ordinary skill in the art at the time of invention was made, to modify the invention of monitoring a reactive process, as Ludvikson et al., to include use of reactant gas types used in such a chamber because Chow teaches use of such gases are known and effective, and using materials known to be effective are cost saving in the manufacturing industry.

Claim Rejections - 35 USC § 103

Claims 14-16 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ludvikson et al., as applied to claims 1, 2, 5, 6, 7, 20, 21, 31, and 32 above, in view of Tsai et al. of USPN 6,592,817.

Ludvikson et al. fails to teach specific process parameters, reactant gas, and apparatus limitations during a substrate film formation process as in claim 14, 15, 16, and 30.

As for claim 14, Tsai teaches monitoring the reactant gases containing at least one of a silicon-containing gas (col. 10, l. 63) and a nitrogen-containing gas for depositing a film (l. 3) during a substrate film formation process (col. 12, l. 3).

It would have been obvious to one of ordinary skill in the art at the time of invention was made, to modify the method of monitoring a film forming method, as Ludvikson et al., to include any process parameters known to be effective for such a process, as applicants claimed limitations, because Tsai teaches such methods are desirable, and having knowledge of specific processing parameters would reduce start up costs of using such a method.

As for claim 15, Tsai teaches the reactant gas containing tetraethyl orthosilicate (TEOS) (col. 15, l. 7-15) for depositing a film during a substrate film formation process.

As for claim 16, Tsai teaches during a thermal deposition process, a hot liquid is circulated through the chamber walls to maintain the chamber at elevated temperatures (col. 11, l. 46-49).

As for claim 30, Tsai teaches all the elements of monitoring the release of halide species erosion products, such as silicon halide and silicon oxyhalide. Tsai teaches the deposition of silicon and silicon oxide (col. 3, l. 37 and 41) in the process chamber (col. 3, l. 32), the presence of halide ion (claim 8) which are contributed by etchants which are free fluorine radicals, NF_3 (col. 3, l. 50), then by conversion of gas to dissociated species (col. 3, l. 47-49), are monitored (claim 43) as a halide species erosion product. Because the chemistry of a halide species erosion products are present and monitored, halide species erosion products such as silicon halide and silicon oxyhalide exist.

Claim Rejections - 35 USC § 103

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ludvikson et al., as applied to claims 1, 2, 5, 6, 7, 20, 21, 31, and 32 above, in view of Kim et al. (USPN 6,436,303).

Ludvikson is silent as to the process parameter of temperature, as in applicants' claim 18.

Kim teaches an effective range for etching chamber temperature from about 200 to 800.degree C. (l. 39-40), as defined by claim 18.

It would have been obvious to one ordinary skill in the art at the time of invention was made to select a process temperature, as Kim, when etching, as applicants claim, because Kim teaches an effective etching process for accomplishing the desired etch.

Claim Rejections - 35 USC § 103

Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ludvikson et al., as applied to claims 1, 2, 5, 6, 7, 20, 21, 31, and 32 above, in view of Nakata et al. (USPN 5,989,928).

Ludvikson fails to teach the use of a gas mass sensor.

Nakata teaches the wide use of spectral analysis (col. 6, l.2) measuring from a specified species (col. 5, l. 32, written on "selected"). Nakata also teaches that mass spectrometry (col. 1, l. 37-42) is taught in prior art which includes detecting radicals(col. 1, l. 38) or ions (col. 1, l. 39) such as an etching gas (col. 1, l. 39) or a decomposition (col.1, l. 39) product or reaction product of emissions (col. 1, l. 40).

As for claim 23, Nakata teaches using a mass sensor to detect a mass signal from an erosion product (col. 1, l. 37-42), is a known method for monitoring.

As for claim 24, Nakata teaches the monitoring further comprises determining if an intensity level of the spectral analyzer has reached a threshold value (col. 6, l. 27-29), which is written on the limitation "mass signal".

It would have been obvious to one ordinary skill in the art at the time of invention was made, to modify the monitoring process of Ludvikson, to include the use of mass spectrometry of Nakata, because Nakata teaches such methods provide more accuracy and precision when monitoring a process.

Response to Arguments

Examiner agree with applicants' argument, on page 7, that a person of ordinary skill in the art do not equate system components with a substrate, however, because applicants argue a person of ordinary skill in the art do not equate system components with a substrate, a 35 USC 112 second rejection was applied to claim 2 which explicitly lists "a protective coating" of the group comprising system components. Please see new grounds for rejection offered above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patricia (Patty) George whose telephone number is

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(571) 272-5955. The examiner can normally be reached between 7:00am and 4:30pm on any weekday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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DUY-VU N. DEO
PRIMARY EXAMINER


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